CLAIMS

1) A method of deacidizing a natural gas containing acid gases wherein the following stages are carried out :

(a) contacting the natural gas with a first solvent containing methanol, water and an amine, obtained in stage e), and with a third solvent containing acid gases obtained in stage b) so as to obtain a methanol-containing gas and an acid gas-containing solvent,

(b) contacting the gas obtained in stage a) with a second solvent containing methanol, water and an amine, obtained in stage d), so as to obtain a gas partly freed of acid gases and the third solvent containing acid gas.

(c) expanding the acid gas-containing solvent obtained in stage a) so as to release acid gases and to obtain a partly regenerated solvent,

(d) distilling in a distillation column a first fraction of the partly regenerated solvent obtained in stage c) so as to obtain a gas phase containing acid gases and the second solvent,

(e) mixing a second fraction of the partly regenerated solvent obtained in stage c) with a fourth solvent drawn off at a point of the distillation column so as to obtain the first solvent, the draw-off point being determined for the proportion by mole of methanol of the first solvent to be higher than that of the second solvent.

2) A method as claimed in claim 1 wherein the second solvent contains less than 1 % by weight of methanol.

3) A method as claimed in claim 1 wherein, in stage d), the second solvent is drawn off from the bottom of the distillation column.

4) A method as claimed in claim 1 wherein, in stage e), the fourth solvent is drawn off at a point located between the bottom and the top of the distillation column.

5) A method as claimed in claim 1 wherein, in stage e), the fourth solvent is drawn off in gaseous form at the top of the distillation column and cooled.

6) A method as claimed in claim 1 wherein, in stage c), the acid gas-containing solvent obtained in stage a) is progressively expanded to two pressure levels.

7) A method as claimed in claim 1, comprising :

(f) cooling the gas obtained in stage b) so as to obtain a methanol-poor gas, a hydrocarbon-containing liquid phase and a methanol-containing aqueous phase,

(g) prior to stage a), contacting part of the natural gas with the aqueous phase obtained in stage f).

8) A method as claimed in claim 1 wherein, before stage d), the first fraction of the partly regenerated solvent obtained in stage c) is expanded, then heated by heat exchange with the second solvent obtained in stage d).

9) A method as claimed in claim 1 wherein a third fraction of the partly regenerated solvent obtained in stage c) is fed into the distillation column, the point of introduction in the distillation column of the first fraction of the partly regenerated solvent being different from the point of introduction in the distillation column of the third fraction of the partly regenerated solvent.

10) A method as claimed in claim 1 wherein the amine is selected from the compounds diethanolamine, methyldiethanolamine, methylethanolamine, triethanolamine, diglycolamine and diisopropanolamine.

11) A method as claimed in claim 1, comprising :

(h) cooling the acid gas-containing gas phase obtained in stage d) so as to obtain a liquid phase and an acid gas-rich gas phase, the liquid phase being separated from the gas phase in a separating drum,

(i) cooling the acid gas-rich gas phase obtained in stage h) and the acid gases released in stage c) so as to obtain a liquid phase and a gas phase,

(j) feeding the liquid phase obtained in stage i) into the separating drum.

12) A method as claimed in claim 1 wherein stages a) and b) are carried out at a temperature ranging between 20°C and 80°C and at a pressure ranging between 3 MPa abs. and 10 MPa abs., in stage c), the acid gas-containing solvent obtained in stage a) is expanded to a pressure ranging between 0.1 MPa abs. and 1 MPa abs., and stage d) is carried out at a temperature ranging between 30°C and 130°C and at a pressure ranging between 0.1 MPa abs. and 1 MPa abs.